Collectivist versus Individualist Mobility Regimes? Structural Change and Job Mobility in Four Countries[1]

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Job mobility is produced by structural forces of expansion and contraction as well as by individual choices. But labor market structure and welfare state policies will create distinctive national patterns of labor force adjustment to shifts in technology, markets, and the consequent demand for particular forms of labor. In a four-nation comparative study, U.S. rates of job mobility showed the greatest sensitivity to structural change and to the labor market resources of individual workers. The Netherlands was at the opposite pole, with worker outcomes largely insulated from structural forces. Germany's strong labor market boundaries channeled adjustment within sectors or between employment and nonemployment, while Sweden's pattern was intermediate between that of the United States and Germany.

INTRODUCTION

This article develops a synthesis of labor market and welfare state theory to account for cross-national differences in the labor market response to the changing occupational and industrial distribution. We test this theory

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with a multilevel dynamic model of both demand- and supply-based determinants of job mobility. We use this model to study a decade of change in four industrialized countries, the United States, Germany, Sweden, and the Netherlands, which are characterized by important differences in labor market structure and in welfare-state policies that influence the pattern of worker response to structural change in the labor market. We show how nationally distinct combinations of labor market and welfare state structure have produced distinctive national responses to the adjustment process.

Dislocations in the labor market have become a prominent feature of advanced industrial societies during the past couple of decades. The presumed causes are well known: technological change in the manufacturing sector, the development of a global market, the growth of the service sector, changes in the role of women, and the continued development of the wel fare state. The most visible manifestations of these dislocations include rising inequality in wages, the decline of the working class, growth in unemployment, declining labor force participation by men over 50, and markedly expanded opportunities in managerial and professional occupations.

The process of change has not been uniform across all countries. However, a satisfactory account for cross-national differences has been elusive. A principal reason for this difficulty is the still-existing separation between market and state-based theories in stratification research. Comparative analyses of wages draw heavily from the literature on neocorporatism to contrast the decentralized, dualist, market-based wage-setting mechanisms found in the United States and the more centralized wage-setting institutions in many European countries (Goldthorpe 1984). The literature on work careers typically relies on distinctions between "open" and "closed" employment relationships (Sørensen and Tuma 1981), or between

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occupation-based, organization-based, and "secondary" labor markets (Althauser and Kalleberg 1981). These concepts continue to be useful tools for comparative research. However, as explanations for the dynamics of labor market adjustment, they are incomplete. They conceptualize outcomes only in terms of labor market resources that are attached to particular positions in the labor market. Yet the recent dynamics of advanced industrial societies have involved forces that change the supply of positions within occupations and within organizations. These changes require reallocations of workers that cannot be fully accounted for by the labor market resources vested in now-vanished jobs.

The process of adjustment inevitably involves life-course disruption, and this disruption inevitably triggers the social insurance programs of the modern welfare state. The best-known taxonomies of welfare states (Titmuss 1974; Esping-Andersen 1990) focus on the extent of benefits and the conditions of eligibility. Institutional differences between "liberal," "conservative," and "social democratic" welfare-state regimes clearly affect the financial consequences of career misfortune. However, state policies can also influence the structure of career flows that constitute the process of adjustment to structural change.

Structural change is the process of change in the distribution of jobs across the occupational or industrial spectrum. It arises from a combination of economic and technological developments as they are enhanced, damped, or otherwise mediated by the sociopolitical environment. Absent any institutional regulation, these pressures would work through the system in a highly turbulent way, leading to the restructuring of many existing establishments and firms, the death of some, and the birth of others. This turbulence, however, can be damped or channeled when institutional forces (e.g., collective bargaining or union strike threats, laws or administrative regulations, or more diffuse cultural forces) create incentives or disincentives for particular organizational or individual adaptive responses. Through these incentives and disincentives, institutional forces can change the balance among the five fundamental types of mobility events that contribute to the process of structural change, namely (*a*) entry into the labor force by young workers or recent immigrants, (*b*) job mobility of those already in the labor force, (*c*) exit and reentry of midcareer workers, (*d*) exit and entry into the labor force by women during their childbearing years, and (*e*) retirements and other long-term exits.

Because the structure of institutional constraints and inducements differs across nations, we expect that nations will differ in the extent to which institutions shield or channel the impact of structural change on individual outcomes. At one extreme, shielding is at a minimum and market mechanisms determine the nature of the link. In such an environment,

we expect individual-level labor market resources to play a major role in differentiating the fates of workers. Such an environment might be characterized as an "individualist" mobility regime (with the United States being perhaps the outstanding example) in contrast to a "collectivist" regime, where an individual's structural location or resources play a more restricted role in labor market outcomes.

But if the United States is one polar extreme, the preceding discussion suggests that there need not exist a simple unidimensional contrast (i.e., a prototypical polar opposite), because the five different flows that make up adjustment will all be influenced, generally in different ways, by a society's labor market and welfare state institutions. As a form of suggestive imagery, the individualist-collectivist dichotomy is attractive. But as an *explanation* for cross-national variation, this polarity is too simple, because it fails to reveal *how* institutional channeling occurs in a context where multiple forms of institutional channeling are possible. This complication can be illustrated against the backdrop of existing welfare state taxonomies, where Sweden, as a "social-democratic" state comes closest to being the polar opposite of the "residualist" United States, with the Netherlands and Germany occupying intermediate positions. In this scheme, life chances in Sweden are made uniform through the process of decommodification induced by universal, citizenship-based welfare benefits. However, this process of decommodification, which detaches an individual's life chances from his or her career outcomes, does not necessarily place restrictions on the freedom of action of employers or workers. In fact, the result could be quite the opposite, because pressures to reduce job mobility can be diffused by policies that reduce the impact of forced mobility on an individual's social welfare.

In our view, an adequate conceptual scheme for distinguishing stratification outcomes must make use of both labor market and welfare state dimensions while recognizing that these two institutional axes are fundamentally linked (Rein 1985; Esping-Andersen 1990). State regulatory policies can affect the level of turbulence of the labor market, that is, the aggregate level of job mobility.[2] They also can affect the size of the mobil-

[2] Overall levels of job mobility are determined in part by birth and death rates of jobs, which themselves are largely a function of the birth and death rates of establishments and firms (Davis, Haltiwanger, and Schuh 1996). Determinants of national rates of birth and death of jobs, establishments, and firms include (1) the technological mix of the economy, (2) the size distribution of firms in the economy, (3) the level of product market competition, which is affected by factors such as antitrust regulation and other market governance mechanisms that increase or decrease the rate of opportunities for firm, plant, and job births and deaths (Hamilton and Biggart 1988; Leonard and Schettkat 1991; Hannan and Carroll 1992), (4) the size of the state sector, which is generally more stable than the private sector, and (5) the level of employment security, which may influence the rate of job deaths. Existing studies suggest that the United

ity components that together produce the net *direction* of mobility flows generated by structural change. It of course must be the case that workers flow away from jobs that are eliminated and toward jobs that are created. Furthermore, it is now well established that many workers are hired by organizations that are contracting, just as workers often exit organizations that are expanding (Davis et al. 1996; Lane, Stevens, and Burgess 1996). On balance, however, workers will flow out of declining sectors and occupations and will flow into expanding ones.

But the workers who leave contracting establishments, occupations, or industries are not necessarily the *same* workers who take jobs in expanding sectors. Workers who leave contracting sectors can move relatively quickly into new jobs, or they can become jobless for a short or an extended time. Indeed, contraction that is achieved through the retirement of older workers does not generate any job-to-job mobility flows. Similarly, expansion can be achieved either through job mobility or through imbalances across sectors in the rate of accession from the ranks of the nonemployed (especially the cohorts newly entering the labor market). The particular labor market and welfare-state characteristics of a society will determine the overall amount of mobility that is generated by the process of job creation and destruction, as well as its direction.[3]

Four dimensions that are intrinsic to welfare state and labor market institutions influence both the size of excess job flows (those not strictly required by the process of job creation and destruction) and the direction of these flows in response to structural change. The first is the *level of job security.* Countries differ in the ease with which workers can be separated from their jobs and the conditions under which separations can occur. These differences follow partly from official policies to protect workers and/or to increase market efficiency by reducing the moral hazard problems that arise when employment security is left to the realm of private contracting between employers and workers (Büchtemann 1993, pp. 55–

States has higher levels of job creation and destruction than Germany (Leonard and Schettkat 1991) and comparable levels to those of Sweden (Davis et al. 1996). Data on the Netherlands are unavailable, but birth/death levels presumably are in the same range as Germany.

[3] Various estimates suggest that roughly two-thirds of job moves do not involve a just eliminated or a newly created job (Davis et al. 1996; Lane et al. 1996; Anderson and Meyer 1994). An unknown additional fraction of mobility may indirectly result from the process of vacancy creation and destruction (e.g., when a worker changes jobs to take a job that was vacated by a worker who moved to a newly created job, or when a worker loses his job because his employer would prefer to replace him with a worker seeking a new job because his old job was eliminated). Each society probably has a third component of "pure" exchange mobility that is not directly or indirectly linked to the process of job creation and destruction, but estimates of this third component must await more precise estimates of the size of the first two components.

59). They also arise from the agreements negotiated between unions and employers. Cross-national differences in the average level of employment security affect the rate of separation, and possibly also the balance between accessions and structural change as components of the adjustment to structural change. The other three dimensions concern the direction of mobility when it does occur. *Employment-sustaining labor market policies* are policies that facilitate employment and are specifically targeted at workers seeking either a job or a new job. This group would of course include workers whose jobs had become redundant as part of the larger process of structural change. *Welfare-sustaining employment exit policies* on the other hand are designed to insure against serious declines in living standards for those workers who leave employment. A dominant component of these polices is the public pension system for those leaving the labor force at the normatively prescribed retirement age. An important additional component, however, consists of programs that stabilize social welfare for those who leave employment because of job loss, or disability, or in some cases as part of an early retirement program. The fourth dimension, the *strength of labor market boundaries* between organizations, occupations, or industries, regulates both the amount of job mobility and the direction such mobility takes. Taken together, these four dimensions influence the contribution of particular mobility pathways to the overall process of adjustment.

Neither a pure welfare state approach nor a pure labor market approach can by itself account for a country's placement within these four dimensions. The Esping-Andersen taxonomy is centered on the concept of decommodification. It nicely distinguishes the Scandinavian social democratic societies, where social rights are individual-based and universal, from "corporatist" welfare states, such as Germany and Austria, that attempt to protect against a change in a worker's market-based "life chances" without undermining traditional status or family structure. But the decommodification dimension does not adequately address *how* social welfare is maintained. Incomes policies, employment protection policies, and social insurance against employment loss can all play a significant role in this process.

All three European societies give workers certain incumbency rights to their job (Büchtemann 1993; OECD 1994).[4] The United States is generally

[4] Virtually all rankings place the United States lower than the European countries in employment protection. Mayes and Soteri (1994), Bertola (1990), and Grubb and Wells (1993) rank Germany as more protective than the Netherlands, while Emerson (1988) reverses their ranking. Emerson and Grubb and Wells rank Sweden as less protective than Germany and the Netherlands, while Lazear (1990), who did not rank the Netherlands, placed Germany and Sweden together in a middle group with the United Kingdom and the United States at the low end.

considered to have the weakest job security policies of any of these four countries. But Sweden's version of job security must be understood within the context of the Scandinavian model of social democracy. This model included a core commitment to full employment that was not predicated upon iron-clad incumbency rights (Therborn 1985; Moene and Wallerstein 1995). On the contrary, the Swedish model of wage compression was expected to generate labor turnover by using wage pressure to force technologically backward firms out of business (Rehn and Meidner 1953; Björklund and Holmlund 1987; Swenson 1989; Moene and Wallerstein 1995). Full employment was to be maintained through a combination of macroeconomic policies that kept aggregate employment high (Calmfors 1993) and active labor market polices that facilitated job mobility through retraining, mobility grants, and temporary jobs.[5]

Germany, in contrast, embarked on what has been called a "concerted transition from work to welfare" in which older workers came to be seen as the source of "a highly flexible adjustment potential to changes in the demand for labor" (Naschold, Oppen, Peinemann, and Rosenow 1993, pp. 117, 119). Through disability programs, through long-duration unemployment and generous income assistance benefits, and through retirement programs linked to the state of labor demand, the gap between Sweden and Germany in labor force participation of men in their fifties and sixties grew rather wide during the 1970s and 1980s. The welfare-sustaining labor market exit programs of the Netherlands were even more liberal than those of Germany, so that by 1990 only two-thirds of men in their late fifties and only 23% of men in their early sixties were still working in the Netherlands (as compared with 79% and 34% in Germany, and 88% and 63% in Sweden, respectively). As of 1994, 44% of private-sector companies in the Netherlands were operating early retirement plans (Foster 1994). Furthermore, the disability programs of the Netherlands reached ever-larger fractions of the workforce, so that by 1989 13.7% of the employment age population of the Netherlands was participating in a disability program as compared with 7.8% in Germany and 5.5% in

[5] Sweden's active labor market policies are easily the most extensive in Europe (Rehn 1985). Certain components of the "Swedish model" lost momentum in the 1980s. Wage compression came to a halt in that decade, as did the highly centralized system of wage negotiations. Heavy devaluations in 1981 and 1982 relaxed the pressure on firms to economize, even if outright subsidies to economically troubled firms ended with the return of the social democratic government in 1982. There is also some evidence that wage-driven mobility due to "solidaristic" wage compression was lower in the 1980s than the two previous decades (Edin and Topel 1997). Nonetheless, the extensive active labor market programs that were designed to facilitate job mobility and support full employment were not cut back.

Sweden. In contrast to Germany and the Netherlands (and in keeping with the social democratic model), Sweden's generous unemployment benefits are limited to one year (OECD 1994), thus providing incentives for workers to enroll in active labor market programs (Calmfors 1993). In the United States, in contrast to the European societies, unemployment benefits are both low and of short duration.

The strength of labor market boundaries between jobs will also play an important role in channeling and limiting the job mobility component of structural adjustment. Germany in particular, with its strong credential-based occupational structure, its strong links between school and work, and its high labor costs, has restricted the viability of midcareer shifts as a tool of structural adjustment (Blossfeld and Mayer 1988; Müller, Steinmann, and Ell, in press). Sweden, in contrast, has much weaker occupational boundaries; Swedish labor organizations placed greater emphasis on class than on occupational solidarity and the credential barriers found in Germany never reached similar heights in Sweden (Therborn 1988). Sweden also has relatively low organization-based labor market boundaries due to the fact that welfare benefits are universal rather than tied to a specific job with a specific employer. Occupational boundaries in the Netherlands appear to be intermediate in strength between those of Sweden and Germany (den Broeder 1995, 1996). The Netherlands has a well-developed system of vocational education, but educational credentials are not a prerequisite for occupational entry to the same extent as in Germany (den Broeder 1995; de Graaf and Ultee, in press; Müller et al., in press; Müller and Shavit, 1997).

The distinction between collectivist and individualist mobility regimes remains a viable and indeed fundamental distinction. However, the above discussion suggests that collectivist regimes can take many forms. Table 1 ranks the countries in our study along the four dimensions that shape the direction of mobility.[6] The United States is always at the right side of the diagram, reflecting its "residual" welfare state and relatively unregulated markets. Either Sweden, the Netherlands, or Germany takes the opposite pole, depending on the dimension. Thus, we expect the adjustment process to be multidimensional, with outcomes a function of the particular configuration of institutional mechanisms that characterize a country's labor market and welfare state. We formalize these expectations in the following section, which first focuses on expected commonalities in the adjustment process, and then on country-specific differences.

[6] We include Italy and Spain on the employment security dimension to emphasize that none of the countries in the current study belong at the left end of this dimension.

TABLE 1

Country Rankings by Social Welfare Policies and Labor Market Structure

	Level and Direction of Mobility			
	High			Low
Stability of jobs (barriers to job creation)		Germany Netherlands(?)		United States Sweden
Employment security	(Italy, Spain)	Germany Netherlands Sweden		United States
Employment-sustaining active labor market policies	Sweden	Germany Netherlands		United States
Employment-sustaining employment exit policies	Netherlands	Germany Sweden		United States
Occupational boundaries	Germany	Netherlands	Sweden	United States

HYPOTHESIZED CONSEQUENCES OF STRUCTURAL CHANGE ON MOBILITY OUTCOMES

In this section, we offer hypotheses about several forms of job mobility. We begin by clarifying our terminology. We refer to job mobility with the same employer as "within-employer" mobility. Job mobility involving employer change to another job in the same industry is referred to as "between-employer/within-industry" mobility or more succinctly as "within-industry" mobility. Employer change accompanied by a change of industry is referred to as "industrial" mobility, while job change involving a change of occupation is referred to as "occupational" mobility. Finally, "employment exit" is a change from the employed state either to unemployment—for reasons other than temporary layoff—or out of the labor force.

Structural change is by definition a shifting of the industrial and occupational structure of a society. Therefore, it *must* have implications for the jobs and for the careers of the workers who make up the workforce. The mere fact of structural change does not, however, predetermine the pattern of worker response, because–as we noted in the previous section–there are multiple mechanisms by which labor force adjustment can occur. Generally speaking, however, we expect changes in adjustment flows to mirror the overall direction of change in the size of the category. That is, we expect industries with contracting employment to have relatively greater levels of job separation as well as lower rates of accession. Simi-

larly, we expect growing occupations to have higher rates of accession and lower rates of separation. These expectations, which we formulate in the first two hypotheses, must of course be understood as predictions that are *net* of the inherent rate of turbulence—that is, the overall rate of job mobility—that characterizes a particular occupation or industry.

HYPOTHESIS 1.—*Industrial and occupational mobility is a positive function of contraction in the origin industry and in the origin occupation.*

HYPOTHESIS 2.—*Employment exit is a positive function of contraction in either the origin industry or the origin occupation.*

The relationship between structural change and within-industry or within-employer job mobility is more complicated because offsetting effects may be operating.

HYPOTHESIS 3.—*Within-industry mobility should be a positive function of job creation within the origin industry (which pulls individuals into new jobs), but possibly also of job elimination within the origin industry (which stimulates job mobility). Given the difficulty of displaced workers finding new jobs in contracting origin industries, however, we expect the net effect of contraction on within-industry mobility to be negative, and thus the net effect of expansion on within-industry mobility to be positive.*

Finally, we conjecture that within-employer mobility should be a positive function of occupational or industrial expansion (which creates new opportunities in many organizations), but also of occupational or industrial contraction (which stimulates reorganizations that in turn stimulate within-employer job mobility). The balance of these effects is a matter for empirical investigation.

Next, we formulate hypotheses about cross-national differences in the relationships between individual resources, structural change, and job mobility. We first state these hypotheses in an abstract way. Their specification for the particular countries in our study follows in a straightforward fashion from the ranking of these countries in table 1.

HYPOTHESIS 4.—*The effects of structural contraction on job mobility to new occupations and industries is inversely related to social welfare programs that make nonemployment an attractive option, and to the strength of job security, which forces greater reliance on hiring reductions and early retirement as a way for organizations to shrink.*

HYPOTHESIS 5.—*The effects of structural contraction on job mobility to new occupations and industries is stimulated by active labor market policies designed to facilitate job mobility.*

HYPOTHESIS 6.—*The effects of structural contraction on job mobility to new occupations and industries is an inverse function of the strength of labor market boundaries.*

HYPOTHESIS 7.—*The effects of structural contraction on employment exit is a positive function of labor market boundaries and a positive function of welfare-sustaining employment exit policies.*

HYPOTHESIS 8.—*The effects of structural expansion on job mobility within the occupation or industry is directly related to the strength of labor market boundaries, which inhibit mobility to other occupations or industries.*

The rationale for these hypotheses follows naturally from the theoretical discussion of the previous section. Structural contraction will generate flows out of contracting occupations and industries, and the destination is more likely to be nonemployment or other occupations and industries in proportion to (1) the attractiveness of nonemployment, (2) the effectiveness of policies designed to facilitate job mobility, and (3) the strength of labor market boundaries that might impede these flows. The effect of job security is also to reduce the amount of job mobility in response to contraction, because employment security pressures employers to lower the rate of new hires or to induce voluntary retirement in order to accomplish employment reductions. In table 2, we diagram the country-specific implications of these hypotheses. Our hypotheses imply that Sweden should exhibit positive effects of contraction on occupational and industrial mobility. The United States has relatively meager active labor market policies, but hypotheses 4 and 6 imply that the United States should also have high occupational and industrial mobility in response to contraction. Our hypotheses predict moderate to low occupational and industrial mobility for Germany and the Netherlands. Hypothesis 5 predicts that employment exit is stimulated by contraction in the face of strong labor market boundaries and strong welfare-sustaining employment exit policies. Germany and the Netherlands have the strongest labor market boundaries, and these countries also have the strongest welfare-sustaining employment exit policies. Thus, we predict the strongest impact of contraction on employment exit should be found in Germany and the Netherlands, followed by Sweden and the United States. The ordering of countries from hypothesis 8 follows naturally from our reading that Germany's labor market boundaries are highest, closely followed by the Netherlands, and more distantly by Sweden and the United States.

We make no prediction about how labor market structure and welfare state policies might modify the effect of net change on internal reassignment. Greater protection against layoff should motivate employers to retrain and reassign redundant workers internally (Sengenberger 1990).[7] It

[7] For example, the rate of internal reassignments in the German system is enhanced by social plans negotiated by the works councils that encourage capital investment

TABLE 2

COUNTRY-SPECIFIC PREDICTIONS

	MOBILITY			
	High			Low
Contraction effects on mobility to other categories:				
Hypothesis 4	United States	Sweden	Germany Netherlands	
Hypothesis 5	Sweden	Germany Netherlands		United States
Hypothesis 6	United States	Sweden	Netherlands	Germany
Summary (4 + 5 + 6)	United States Sweden		Germany Netherlands	
Contraction effect on employment exit:				
Hypothesis 7	Netherlands Germany		Sweden	United States
Expansion effect on within-category mobility:				
Hypothesis 8	Germany	Netherlands	Sweden	United States
Importance of individual-level resources				
Hypothesis 9	United States	Sweden	Netherlands	Germany
U-shaped tenure and experience effects:				
Hypothesis 10	Netherlands	Germany	Sweden	United States

is frequently argued that workers in the three European countries that we consider are more broadly trained than American workers and thus more easily reassigned (Allaart, Praat, and Vosse 1994; Sengenberger 1990), which should boost their rates of within-employer mobility in contracting sectors. However, the functional relationship between net change and within-employer mobility also depends upon the extent to which industrial or occupational expansion is accomplished primarily through growth of existing organizations (which may generate promotions) or through the creation of new organizations (whose vacancies initially are filled only through hires). Little is known about the ratio between these two kinds of job creation across countries. Furthermore, the level of

to save jobs and rotation exchange (*Ringtausch*) linked with early retirement. This system has been particularly effective in the steel industry (Thelen 1991).

within-employer mobility during reorganizations may also be enhanced by higher levels of employment exit from the firms, since these departures (or exits) create pressure for reassignment to cover the functions once handled by departing workers. We leave the cross-national pattern of within-employer response to structural change as a matter for empirical investigation.

We finally propose two hypotheses concerning the implications of welfare state and labor market policies for the relationship between an individual worker's labor market resources and the rate and direction of job mobility.

HYPOTHESIS 9.—*Mobility rates vary more strongly with a worker's labor market resources in countries with weaker employment protection and weaker labor market boundaries.*

HYPOTHESIS 10.—*The relationship of employment exit to tenure or labor force experience will be more steeply curvilinear (falling and then rising) in countries with strong welfare-sustaining employment exit policies.*

Hypothesis 9 follows from the claim that labor market regulations have the biggest impact on workers with the lowest level of labor market resources. In relatively unregulated labor markets, workers gain stability through their own personal characteristics. Workers with valuable job skills in unregulated labor markets can use their skills to gain the kind of employment security that is extended to a broader class of workers through regulation in countries with more highly regulated labor markets (Althauser and Kalleberg 1981). Of the four countries in this study, the United States has the most unprotected and hence "dualistic" labor market. We therefore expect individual resources—specifically education and employer tenure—to differentiate the level of protection more sharply in the United States than in the three European countries. Sweden's employment security system is more tenure based than is the system of either the Netherlands or Germany (where security is afforded to nearly all workers after an initial probationary period). Therefore, we expect Sweden to be an intermediate case in the relationship between employer tenure and job mobility. The Netherlands and Germany should have the least differentiated workforce.

The greater use of early retirement and disability in the process of labor market adjustment in Germany and the Netherlands would lead to the prediction of a stronger curvilinear relationship between age or experience and employment exit in the Netherlands and Germany than in the United States or Sweden (hypothesis 10). However, this prediction is somewhat undermined by an offsetting relation: while early "permanent" exit may be rarer in the United States, short-term exit (followed by reentry) is rather common. In this article, because we look at any type of exit regardless of duration, the effects of age or experience will depend upon the relative

mix of long-term and short-term exits as well as on the structural determinants of each type of exit.

A BASIC MODEL

Ideally, one would like to specify a macro-micro model based on three structural components: the rate of job creation, the rate of job elimination, and the inherent (equilibrium) tendency toward turbulence for any particular job category. Such information is very difficult to obtain for entire economies even for a single nation.[8] Information on turbulence and on net structural change, which is generally available from survey data, is therefore a useful approximation, especially if the categories have reasonably fine detail. In our work, therefore, we use net change in the most detailed occupations and industries available in national data sets along with a measure of turbulence as our operationalization of structural forces.

The algebraic relationships between turbulence, gross flows, and net change can be expressed rather simply. Let

n_{jt} = the size of category j in year t.
Δn_{jt} = the change in size between t and $t + 1$, that is, $\Delta n_{jt} = n_{jt+1} - n_{jt}$.
S^{+}_{jt} = the gross flow into category j between t and $t + 1$, that is, the total number of workers who entered category j between t and $t + 1$.
S^{-}_{jt} = the gross flow out of category j between t and $t + 1$.
S_{jt} = the average flow, what we call "turbulence," that is, $S_{jt} = (S^{+}_{jt} + S^{-}_{jt})/2$.
R_{jt} = the net change, that is, $R_{jt} = S^{+}_{jt} - S^{-}_{jt}$
s_{jt} = S_{jt}/n_{jt}, $r_{jt} = R_{jt}/n_{jt}$, the *rates* of turbulence and net change, respectively.
p_{it} = the probability of job mobility of the indicated type for individual i between t and $t + 1$.

Using the above terminology, we specify a "turbulence-change" model for job mobility as

$$\frac{p_{it}}{1 - p_{it}} = e^{\alpha_1 \log(s_{jt}) + \alpha_2 \log(1 + r_{jt}) + \mathbf{X}'_{it}\beta}. \quad (1)$$

In this discrete-time log-logistic model (Cox and Oakes 1984; Yamaguchi 1991), t indexes years, α_1 is the effect of turbulence on job mobility, and

[8] Rates of job creation and destruction are available in the United States for the manufacturing sector and for selected states (see Davis et al. 1996). Comparable databases are not publicly available for the Netherlands, Germany, or Sweden.

α_2 is the effect of net change; $\mathbf{X}_{it}$ is a vector of possibly time-varying individual-level labor market resources and liabilities known to affect rates of job mobility, and $\boldsymbol{\beta}$ is the time-independent vector of coefficients for the variables in $\mathbf{X}_{it}$, including an intercept term. We specify s and r as logarithms in order to maintain a sensible relationship between these variables and p.[9] This model estimates what might be termed the "push" effects of structural change. In other words, it can estimate how structural change in the origin position combines with individual-level variables to generate job mobility (the differential "pull" of possible destinations is a topic we leave to future research).

To estimate the turbulence-change model, we combined data from longitudinal surveys with data from repeated cross-sectional labor force surveys for each of the four countries (in the case of Germany, we included only the former West German states). We estimated our models for a period of roughly 10 years beginning in the early 1980s and ending in the early 1990s, with some cross-national variation in the exact starting and ending year attributable to practical data-related considerations. We provide details concerning the data sources for each country in the appendix. Time-series data from the labor force surveys in each country were used to estimate yearly net change rates for detailed occupations and industries. Data on job mobility, on worker attributes, and on turbulence were obtained from the panel data available for each country. Our analysis focuses on male workers, ages 18–64 in the origin year (16–63 in Sweden). We excluded the agricultural sector from our analysis.

We specified five parallel models, one for each of the following dependent variables: within-employer mobility, within-industry mobility, industrial mobility, occupational mobility, and employment exit. In each case the risk set was defined as everyone who had a job as of the survey date in year t. Changes in status between that time and the time of the survey in year $t + 1$ were used to define events.[10] Industrial and occupational mobility were measured with respect to detailed occupation and industry codes. To reduce the effects of coding error in our analysis, we only counted instances of occupational mobility when the head or partner actually reported job mobility during the relevant period of time, and we only counted instances of industrial mobility that were accompanied by

[9] Since p is typically small, $p/(1 - p)$ is approximately equal to p. For a given individual i, therefore, eq. (1) reduces approximately to $p_{it} = k_i s_{jt}^{\alpha_1} (1 + r_{jt})^{\alpha 2}$ where k_i is an individual-specific constant. If the rate of net change were zero, this becomes $p_{it} = k_i s_{jt}^{\alpha_1}$.

[10] We only counted instances of employment exit when the sample member was still not employed as of the survey date in year $t + 1$. This allowed us to make use of questions that distinguish true job separation from temporary layoff.

a change of employer or a change involving self-employment status. We were able to use three-digit coding schemes for the United States, the Netherlands, and (in the case of occupations) for Germany. However, we were constrained by data limitations to using two-digit occupation and industry codes for Sweden, and to using two-digit industry codes for Germany. Thus, the analyses for within-employer mobility and for employment exit are quite comparable for all four countries. Analyses of occupational mobility are comparable for the United States, the Netherlands, and Germany, while the results for Sweden are probably influenced somewhat by the higher level of aggregation, which will reduce the level of observed mobility. In the case of within-industry and industrial mobility, comparisons between the United States and the Netherlands, and between Germany and Sweden involve a similar level of disaggregation for the dependent variable.

For each model, we included the following individual-level covariates:[11]

1. Potential experience (age − education − 6) and the square of this variable, measured as of year *t*.
2. Education measured with a set of categories that is appropriate for each country's educational system (see the appendix).
3. Years of tenure with the current employer as of year *t*.

Our two macrovariables were measures of turbulence and net structural change. We obtained information on net change rates from repeated cross-sectional labor force surveys. We estimated net change rates at the level of detailed occupation and industry codes, as described above, and in more detail in the appendix. For the U.S. and the Dutch data, we used polynomial smoothing in order to reduce the level of noise in year-to-year net change for the detailed occupations and industries. We then further adjusted the yearly change scores of both countries so that they would be consistent with measures of structural change at the industrial- or occupational-sector level from the same data.[12] The German 1% *Mikro-*

[11] The German results also controlled for membership in the foreign oversample. This coefficient was significantly negative for within-employer mobility, but otherwise did not achieve statistical significance. The use of additional covariates for the American case (race and average firm size in the industry) can be found in DiPrete and Nonnemaker (1997). The results are not greatly changed by the inclusion of these additional covariates.

[12] For the U.S. data, we further adjusted the individual time series so that the 10-year rate of growth was equal to the 10-year rate of growth estimated from the 1% Public Use Microdata Sample (PUMS) for the 1980 and 1990 census. As a final step for both the Dutch and the U.S. data, we estimated yearly net change for the detailed categories in each country as a weighted average of net change for the detailed category and net change for the occupational or industrial sector to which it belonged. The weights

zensus has a much larger sample size than the labor force surveys of the other three countries, and we were therefore less concerned about sampling fluctuations in the German data. Sampling error was also less of a concern for the Swedish case because of the greater aggregation in the occupational and industrial categories.

To measure turbulence, we obtained information from the panel studies for the United States, the Netherlands, and Germany, and from the labor force surveys for Sweden. These tabulations were done at an aggregate (industrial or occupational) level, which was necessary because of the relatively limited sample sizes in the panel studies. Our estimates of both turbulence and net change are based on the entire population of workers, including both men and women. In effect, we measure how men's mobility responds to structural change in the entire employment structure of a nation.

The Dutch longitudinal data differ from the data of the other three countries in that job mobility is measured on a biannual rather than an annual basis. We converted the reported rates to one-year rates to make them comparable with our measures for the other three countries. The Swedish longitudinal data differ in certain respects from the other three countries (see the appendix). After confirming with the Level of Living data (see below) that the macroeffects were not changed much by the use of a reduced set of individual-level variables, we estimated the model with both the Level of Living and the Labor Force Survey data sets. We report below the coefficients for the macrovariables using the Labor Force Survey data, and we report the coefficients for the individual-level variables using the Level of Living data.

RESULTS

Rates of Net Change and Gross Flow

Table 3 presents summary information about the average yearly net change rates, average yearly gross flows, and estimates of average yearly mobility rates of various types for industry sectors and for EGP classes (Erikson, Goldthorpe, and Portocarero [1979], as modified by Ganzeboom, Luijkx, and Treiman [1989]) as computed from our data for each country.[13] Table 3 shows broadly similar change in all countries: the service

for the category score were directly proportional to the sample size for that category in the labor force. For categories with a sample size of about 50 in each year's labor force survey, the weights for the net change at the occupational or industrial-sector level and at the detailed category level are about equal.

[13] In Sweden the Level of Living survey was used to cross-classify Erikson and Goldthorpe's actual EGP codes with detailed occupations and industries. This cross-

sector expanded relatively rapidly while the manufacturing sector either experienced slow growth or contraction.[14] At the same time, growth rates were relatively high for the service class, for routine nonmanual workers, and for EGP class IVa and IVb (the self-employed except for self-employed service class workers and self-employed farmers). In contrast, net change rates for manual workers were stagnant or slightly declining.

These industrial and occupational trends have occurred against a background of sharply different growth rates in the labor force of the four countries (OECD 1993). The labor force of the United States grew substantially—between 1979 and 1989 employment increased by 3.5% per year in the United States. In contrast, the labor force of Western Germany was on average fairly constant in size, but this average rate (0.7% per year) hides a rather high growth rate starting around 1988 that offsets a near stagnant growth rate at the start of the 1980s. The growth rates of Sweden (2.3% per year) and the Netherlands (1.4% per year) fell in between these two extremes.

Table 3 also shows the rates of gross inflow and outflow by industry sector and by EGP class for the four countries. Overall, gross flow rates were highest in the United States. Sweden, Germany, and the Netherlands had lower and fairly comparable rates of gross flow during this period.[15] In all four countries, gross flow rates were highest for wholesale and retail trade. Gross flows were generally lower for manufacturing, mining, and utilities, for transportation, storage, and communication, and for community, social, and personal services. With respect to EGP classes, gross flow rates in the United States were relatively high for routine nonmanual workers, for semi- and unskilled manual workers, and for class IVa and IVb workers when compared with either the service class or with skilled manual workers. The German, Dutch, and Swedish patterns are generally similar to that of the United States, except for the comparatively lower gross flow rates for the self-employed in these three countries.

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classification was used to create a modified EGP scheme that could be used with the Swedish labor force surveys.

[14] The manufacturing sector shrank more rapidly in relative terms in the United States than in the Netherlands, Germany, or Sweden, though the more rapid growth of the labor force in the United States caused the actual growth rate of manufacturing in the United States to approximate the rate in the other three countries (OECD 1993).

[15] Summary estimates of these flows are available for the United States and Germany using establishment surveys for the United States and using the *Arbeitskräftegesamtrechnung* for Germany. Schettkat (1992) computed a yearly "substitution rate" for the two countries. His measure also shows that the German flow rate is much lower than the American one.

TABLE 3

RELATIONSHIP BETWEEN YEARLY NET CHANGE, GROSS FLOWS AND INDIVIDUAL MOBILITY RATES

	Net Change	Gross Inflow	Gross Outflow	Within-Employer Mobility	Rate of Employer Change	Industrial Mobility	EGP Employment	
							Mobility	Exit
				Netherlands				
Manufacturing, mining, utilities	−.009	.083	.092	.063	.072	.055	.052	.028
Construction	.013	.083	.069	.029	.099	.043	.048	.029
Wholesale/retail trade	.026	.126	.100	.043	.090	.063	.054	.021
Transportation/communication	.017	.078	.061	.059	.053	.029	.032	.026
Business services	.043	.128	.085	.047	.098	.059	.048	.019
Personal/government services	.021	.100	.079	.061	.057	.031	.040	.028
Service class, I/II	.027	.130	.103	.063	.074	.046	.040	.023
Routine nonmanual, III	.029	.157	.129	.061	.072	.046	.068	.019
Self-employed, IVa, IVb	.016	.130	.114	.000	.041	.019	.015	.015
Skilled/manual supervision, V, VI	.008	.099	.091	.050	.073	.045	.050	.027
Semi- and unskilled, VIIIa	.021	.136	.116	.038	.088	.056	.050	.036
				Germany				
Manufacturing, mining, utilities	.005	.089	.084	.030	.049	.029	.029	.046
Construction	.021	.122	.100	.010	.077	.041	.023	.081
Wholesale/retail trade	.020	.137	.117	.015	.100	.053	.029	.066
Transportation/communication	.019	.087	.069	.035	.048	.022	.023	.046
Business services	.025	.119	.094	.047	.088	.035	.054	.033
Personal/government services	.017	.105	.088	.036	.039	.024	.019	.053
Service class, I/II	.024	.120	.096	.044	.058	.026	.030	.041
Routine nonmanual, III	.022	.138	.116	.035	.064	.030	.042	.056
Self-employed, IVa, IVb	.014	.125	.111	.013	.058	.018	.049	.033
Skilled/manual supervision, V, VI	.004	.107	.103	.023	.065	.030	.024	.065
Semi- and unskilled, VIIIa	.010	.163	.154	.025	.062	.034	.040	.084

	United States							
Manufacturing, mining, utilities	−.001	.13	.13	.090	.081	.060	.071	.055
Construction	.024	.19	.17	.038	.166	.101	.102	.073
Wholesale/retail trade	.019	.24	.22	.046	.160	.103	.099	.059
Transportation/communication	.019	.12	.10	.089	.102	.058	.082	.055
Business services	.043	.20	.15	.059	.141	.085	.061	.055
Personal/government services	.015	.14	.13	.084	.083	.055	.058	.046
Service class, I/II	.029	.17	.14	.074	.097	.060	.054	.038
Routine nonmanual, III	.023	.28	.26	.105	.129	.096	.139	.060
Self-employed, IVa, IVb	.020	.27	.25	.014	.127	.083	.140	.059
Skilled/manual supervision, V, VI	.007	.18	.17	.072	.114	.071	.080	.060
Semi- and unskilled, VIIIa	.010	.26	.24	.073	.134	.096	.092	.085
	Sweden							
Manufacturing, mining, utilities	−.007	.092	.099	.045	.069	.048	.031	.038
Construction	.007	.109	.102	.020	.091	.035	.028	.049
Wholesale/retail trade	.010	.142	.131	.031	.100	.059	.052	.048
Transportation/communication	.016	.091	.075	.038	.056	.031	.028	.033
Business services	.045	.125	.080	.050	.076	.043	.028	.026
Personal/government services	.014	.106	.092	.049	.079	.043	.030	.044
Service class, I/II	.025	.099	.074	.054	.073	.037	.020	.022
Routine nonmanual, III	.008	.121	.113	.038	.086	.050	.052	.049
Self-employed, IVa, IVb	.011	.110	.099	.000	.044	.023	.024	.030
Skilled/manual supervision, V, VI	−.005	.096	.101	.030	.082	.049	.033	.045
Semi- and unskilled, VIIIa	−.006	.112	.118	.039	.085	.055	.045	.059

Within- and Between-Employer Job Mobility

U.S. rates of internal mobility were substantially higher than were the internal mobility rates for the other three countries. Germany and Sweden had relatively comparable rates of internal mobility, while the Netherlands occupied an intermediate position. The high rates for the United States are consistent with the structure of its internal personnel system, which has been based on relatively narrowly defined jobs, and which in recent years has been highly volatile (Kalleberg 1988; Osterman 1993). The lower rates for Sweden, the Netherlands, and Germany are consistent with their broader job definitions, and perhaps less rapidly changing firms at least over the time period under study here.[16] With respect to industry variation, rates of internal mobility were generally lower in construction and in wholesale and retail trade than in the other sectors in all four countries.

Rates of between-employer mobility were generally higher in the United States than in Sweden or the Netherlands, which in turn had higher rates than Germany. It has been reported elsewhere that Germany's rates of job mobility are low in comparison with the United States (Carroll and Mayer 1986) and that the Netherlands, until the mideighties, had relatively low rates compared with the United States or Sweden (Van Ours 1990). Our results thus differ from previous research in finding a smaller difference between Dutch and Swedish rates than expected. Relatively high rates of external mobility in the United States are explainable by the lack of job security in the United States, the high rate of firm births in

[16] Another possible source of cross-national difference would be differences in the distribution of firm size by employment. All other things equal, one would expect a higher rate of internal job mobility in countries where the average firm size was larger and where a larger fraction of workers were located in large firms. In the United States, for the year 1990, the distribution of employment by establishment size (excluding government employees, railroad employees, which comprise 7% of the employed workforce, and the self-employed, which is another 7% of the workforce) is 1–19, 26%; 20–99, 29%; 100–499, 25%; 500+, 20% (U.S. Bureau of the Census: County Business Patterns, table 857; see U.S. Department of Commerce 1995). For Sweden, the corresponding percentages, which are taken from the Swedish Register of Firms and Establishments, are 1–19, 28%; 20–99, 29%; 100–499, 24%; 500+, 19%—but these figures include government workers (though they exclude the self-employed, who constitute 9% of the employed workforce). Assuming that the missing U.S. government workers are relatively more likely to work in moderate size or larger establishments, it would follow that U.S. workers are somewhat more likely to work in moderate size or large establishments than were Swedish workers. In the Netherlands, the corresponding figures (taken from the *Enquête Beroepsbevolking* 1993, including government workers but not the self-employed) are 1–9, 12%; 10–99, 27%; 100+, 58% (3% unknown). Thus, the Dutch workforce is more heavily concentrated in moderate or large establishments than either the American or the Swedish labor force.

the United States,[17] and the tendency for U.S. employers to hire from the outside market. The biggest cross-national difference concerned the self-employed. Rates of employer change were generally lower for the self-employed than for wage and salaried workers in the Netherlands, Germany, and Sweden, but not in the more turbulent markets of the United States. With respect to industry variation, rates of employer change were generally higher in construction, in trade, and in business services than in manufacturing, transportation and communications, or community, social, and personal services in all four countries.

Employer change can either take place within the same industry or between industries. Table 3 shows the rates of mobility between detailed industries (rates of within-industry mobility equal the difference between the columns for employer change and for industrial mobility). Rates of industrial mobility were generally highest out of wholesale and retail trade. In all four countries, the rates of industrial mobility were relatively high for semi- and unskilled manual workers and for routine nonmanual workers. The rate of industrial mobility from classes IVa and IVb were quite low in Germany, the Netherlands, and Sweden, while in the United States the rate was similar to rates for wage and salaried workers. This cross-national difference stemmed mostly from the cross-national differences in the overall rate of mobility from the self-employed state.

Rates of EGP mobility in all four countries were relatively low for the service class and for skilled manual workers. The EGP mobility for self-employed workers was most common in the United States, which follows directly from the high rate of exit from self-employment in the United States.

Employment Exit

The United States and Germany had the highest rates of employment exit, followed by Sweden and the Netherlands. In all four countries, rates of employment exit were relatively high from the construction industry and the semi- and unskilled manual class. Rates of employment exit were relatively low from banking, insurance, and business services, and from the service class. The rate of employment exit from EGP classes IVa and IVb was relatively high in the United States and relatively low in Sweden, Germany, and the Netherlands.

[17] In the United States, the number of new incorporations per year has been on the order of 8%–12% of the total number of businesses. Birch (1979) has argued that 4/5 of the new jobs created in the United States are in firms less than five years old. This tendency to create jobs via firm births is reportedly lower in Germany (Wohlers and Weinert 1988).

TABLE 4

INDUSTRY TURBULENCE AND INDUSTRY NET CHANGE EFFECTS FOR MODEL 1

	$\alpha - 1$ (Turbulence)		$\alpha - 2$ (Net Change)	
	Coefficient	*t*-ratio	Coefficient	*t*-ratio
Netherlands:				
Within-employer mobility	−.04	.1	−.84	1.7
Within-industry mobility	.04	.1	1.14	1.6
Industrial mobility	1.91	5.7	.26	.5
Occupational mobility	.98	3.5	−.63	1.4
Employment exit	−.50	1.1	.37	.4
Germany:				
Within-employer mobility	−1.32	3.7	−1.55	.9
Within-industry mobility	1.36	3.8	5.88	3.4
Industrial mobility	1.12	3.8	1.88	1.3
Occupational mobility	.26	1.0	3.49	2.6
Employment exit	.80	3.5	−.40	.4
United States:				
Within-employer mobility	−1.04	9.9	−3.45	5.9
Within-industry mobility	.66	5.3	2.08	2.4
Industrial mobility	.65	7.5	−.98	1.7
Occupational mobility	.13	1.7	−1.56	3.2
Employment exit	.24	2.3	−2.37	3.7
Sweden:				
Within-employer mobility	−.23	1.3	1.43	1.2
Within-industry mobility	.93	4.5	3.37	2.2
Industrial mobility	1.23	6.9	−1.05	.8
Industrial mobility (age 45+)	.64	1.2	−9.63	2.4
Occupational mobility	1.24	6.7	.75	.6
Employment exit	.13	.7	−3.89	2.8

NOTE.—Education, experience, and tenure coefficients (β coefficients of eq. [1]) are reported in table 6 below.

Effects of Industrial and Occupational Expansion and Contraction on Job Mobility

We report our results from the turbulence-change model in table 4, table 5, and table 6. Table 4 reports the effects of industry-based structural change, while table 5 reports the effects of occupation-based structural change. Table 6 reports the effects of individual-level attributes associated with the industry net change effects shown in table 4.[18]

[18] The coefficients of individual-level variables when we control for industry net change effects are rather similar to the results we obtain when we control for occupation net change effects. These latter results are available from the authors upon request.

TABLE 5

Occupation Turbulence and Occupation Net Change Effects for Model 1

	α − 1 (Turbulence)		α − 2 (Net Change)	
	Coefficient	*t*-ratio	Coefficient	*t*-ratio
Netherlands:				
Within-employer mobility	.67	2.1	.46	1.7
Within-industry mobility	.50	1.2	−.19	.3
Industrial mobility	.37	1.1	2.01	3.7
Occupational mobility	1.35	4.6	.68	1.5
Employment exit	−.96	2.0	−.41	.6
Germany:				
Within-employer mobility	−.10	.3	1.41	.9
Within-industry mobility	−.46	1.3	4.11	2.3
Industrial mobility	1.13	4.2	−.12	.1
Occupational mobility	.80	3.4	3.55	2.7
Employment exit	.27	1.3	−3.75	3.5
United States:				
Within-employer mobility	−.24	1.9	−2.08	3.4
Within-industry mobility	−.47	2.9	2.36	2.9
Industrial mobility	.62	5.3	−.24	.4
Occupational mobility	.70	7.0	−1.27	2.8
Employment exit	.98	7.0	−2.02	3.3
Sweden:				
Within-employer mobility	.18	1.1	−.21	.1
Within-industry mobility	.21	1.2	1.67	1.1
Industrial mobility	1.12	5.7	.75	.6
Occupational mobility	1.43	9.6	−.58	.4
Occupational mobility (age 45+)	1.21	2.8	−8.64	2.2
Employment exit	.32	2.0	−3.89	2.7

Note.—Education, experience, and tenure coefficients (β coefficients of eq. [1]) are not reported for the occupation turbulence/change model.

Generally speaking, rates of mobility were higher when turbulence was higher. For some transitions, this positive result is essentially tautological, though (as discussed above) it is important to control for this factor to avoid contaminating our estimate of the effects of net change. It is notable, however, that effects of turbulence on rates of within-employer mobility tend to be negative (i.e., higher rates in low turbulence industries) in the United States, Germany, and Sweden. This result, we believe, stems from the tendency for internal mobility to be relatively high in manufacturing, which generally has strong internal labor markets and therefore low turbulence.

The more interesting structural effects concern the net change variable, which measures the effects of "push" from the origin industry and occupa-

tion. In the United States, industrial contraction created a structural "push" into new occupations or industries (referred to here as "push effects" or "push forces").[19] The effect of industrial contraction on occupational mobility was even larger than was the effect on industrial mobility. The effect of structural contraction on industrial mobility was numerically as large in Sweden as in the United States, though the standard error for the Swedish estimate was considerably larger than that for the U.S. estimate. Further investigation of the Swedish data revealed the hypothesized effect of contraction on industrial mobility, but the effect was limited to the population of older workers (see table 4).[20] The Netherlands had no measurable increase in job mobility following industrial contraction, while in Germany the effects were actually positive, contrary to expectations. We discuss this anomaly in more detail below.

With respect to the occupation-based structural-change model, American male workers were more likely to exhibit occupational mobility as a consequence of occupational contraction, and older Swedish workers were similarly more likely to exhibit occupational mobility in response to occupational contraction. For the Netherlands there was an unexpected increase in industrial mobility in response to occupational expansion, while for Germany there was an unexpected positive effect of occupational expansion on occupational mobility.

Next, we focus on the relationship between employment exit and structural change. Industrial contraction clearly increased the rate of employment exit in the United States and in Sweden. The effect of industrial contraction on employment exit in the United States was about twice as large as was the effect on industrial mobility. The effect in Sweden was roughly 50% higher than in the United States. The effects were not significant in Germany or the Netherlands. Workers in three of the four countries experienced significant rises in employment exit in response to occupational contraction (the Netherlands was the exception). The employment exit rate for German workers was more sensitive to occupational than to industrial contraction, which is probably a consequence of the fact that German labor markets are primarily occupational in character. The Swedish effects were the largest, followed by Germany, the United States, and lastly the Netherlands. The results for Germany, Sweden, and the

[19] A one-standard-deviation increase in the rate of contraction increased the exit rate from industries, occupations, and from employment by 3.3%, 5.1%, and 7.9% respectively, according to these estimates.

[20] The effect in Sweden is actually significant if the cutoff is made as low as age 30. We report the results using the age 45 cutoff in table 4 to keep the presentation consistent with table 5. There was no increased tendency for older Swedish workers to change occupations in response to industry contraction.

United States are generally consistent with our expectations. The Netherlands is out of line in its unexpectedly weak employment-exit response to structural change.

As expected, industrial expansion proved to be positively related to within-industry mobility in all four countries. An increase in the growth rate of one percentage point raised the probability of a within-industry mobility by roughly 1.1% in the Netherlands at the low end and 5.9% in Germany at the high end. In Germany and in the United States, men were more likely to change employers within the same industry in response to the opportunities afforded by occupational expansion, with the German effects being the larger of the two. With respect to both the industry- and the occupation-based structural-change models, our results are largely in line with our theoretical expectations, with only the Netherlands being out of the predicted order.

Finally, we examine the effects of structural change on within-employer mobility. Industrial expansion was negatively related to internal movement in the United States, Germany, and the Netherlands. We interpret this negative relationship as a consequence of internal reorganizations that occurred more frequently in contracting or slow growing industries, particularly in manufacturing.[21] Such reorganizations have clearly been ongoing in the United States at a rather intense rate. Germany also has been experiencing internal restructurings in manufacturing in the period under study here (Sengenberger 1987; Bosch 1990), as has the Dutch economy. The lack of negative effects in Sweden suggest that this country has a different mix of the two major sources of internal mobility (the filling of vacancies created by growth, and internal reassignments as part of a restructuring).[22]

In most respects, the results are consistent with our hypotheses. The effects of net change on industrial or occupational mobility were larger in the United States and Sweden than in the Netherlands and Germany, as predicted. The country ordering for hypothesis 7 (effects of contraction on employment exit) and for hypothesis 8 (effects of expansion on within-

[21] This negative relationship is consistent with the connection seen in table 3 between the relatively low growth rates in manufacturing and relatively high rates of within-employer mobility in that sector. While one might expect higher internal rates in industries (such as manufacturing) where the average establishment size is relatively large, other work (DiPrete and Nonnemaker 1997) shows that a significant negative effect remains when the average establishment size in the detailed industry is controlled.

[22] We also estimated models in which we included quadratic effects of net change, in order to see whether the offsetting effects discussed in hypothesis 3 led to a U-shaped effect. A significant U-shaped effect was present in the Netherlands and Germany, but not in the other two countries.

industry mobility) were as predicted for all countries except the Netherlands, which is the major anomaly in our results.

We believe the Dutch anomaly stems from the character of the Dutch welfare-sustaining employment exit policies. In a purely market-driven economy, labor force adjustments are made by individual employers in response to market conditions. However, in more collectivist regimes, the available mechanisms for labor force adjustment are determined partly through collective decisions made at higher levels than the employing organization, which are then institutionalized into pathways made available to most or all members of the workforce. The Netherlands provides by far the best example of this process by virtue of its extensive welfare-sustaining employment-exit programs, as noted above. To the extent that these schemes were only used by employers in contracting industries, they might enhance the employment-exit response to net change (while changing the mix of the employment-exit response toward voluntary and away from involuntary exit). However, as companies in contracting industries resorted to early retirement packages as incentives to induce separations, the very attractiveness of these packages motivated powerful unions in other industries that were not contracting to demand similar packages for *their* members. Meanwhile, the use and misuse of disability programs as vehicles for early retirement spread throughout the country during the 1980s.[23] In their case studies of four firms in growing as well as contracting sectors, Trommel and de Vroom (1993) noted a high exit rate via early retirement in all four firms. They named this phenomenon as "the Loreley effect of early exit; it refers to the continuous 'suction' exerted by the exit option itself, without regard to the social, organizational or financial desirability and/or opportunities" (pp. 107–8).

The consequence of the diffusion of adaptation mechanisms based on job separations through the economy would be twofold. First, this diffusion would wash out the *local* (to the industry) effects of contraction. Models of job mobility would show no effect of contraction or expansion on exit from the category, whether through job mobility or through employment exit. Second, the Loreley effect would necessarily affect a company's use of accessions as a mechanism for adjusting its workforce. As a consequence of the Loreley effect, accession rates in stable or contracting industries and occupations should, ceteris paribus, be relatively low in comparison with countries where this effect is absent. However, accession rates

[23] During the 1990s, the eligibility conditions for disability programs were tightened, rates of exit via disability dropped, and some of the disabled who could not substantiate their disability were forced back into the workforce. Early retirement rates have also recently declined. These changes occur after the period covered by our data, however.

of growing firms need to be even higher in order to offset the employment losses into disability and early retirement. A direct test of these conjectures must be left to an analysis of the role of accession in labor force adjustment, which is outside the scope of this discussion.

The fact that push effects in Sweden were not found for younger workers in Sweden (under 30 years old for the industry model and under 45 for the occupation model) was unexpected. This result may imply that Swedish establishments that are shutting down or laying off workers have relatively older employees. Further research is of course needed to confirm such speculation. We also note that our need to use more aggregated occupational and industrial categories probably produced an underestimate of the push effects in Sweden.

The unexpected positive effect of industrial or occupational expansion on occupational mobility in Germany appears to result from the strong labor market boundaries that characterize the German economy. An examination of the five most populated occupations from the set of most strongly contracting occupations (miners and quarry workers; butchers and meat preparers; police and detectives; bakers, etc.; roof-tile layers, natural stone layers, and tile layers) shows that all five had below-average rates of mobility compared to other occupations. We speculate that these occupations in Germany have limited mobility pathways to other occupations, and thus contraction must occur through reduced accessions and through employment exits. Similarly, the six most populated occupations from the set of mostly rapidly growing occupations (electrical engineers; mechanical engineers; rubber and synthetic fiber product makers; correspondents and reporting clerks; construction engineers; stock supervisors) all had relatively high rates of occupational mobility. At least some of these occupations have natural career pathways to other occupations (e.g., the engineers could move into management), and so rates of occupational mobility were relatively high despite the absence of any push forces. This result emphasizes that structural change is only one among many factors that determine rates of job or occupational mobility.

Individual-Level Variation in the Rates of Job Mobility

Table 6 shows the effects of experience, education, and employer tenure on the five types of job mobility that we study. Because the individual-level coefficients are similar when we specify occupation or industry gross flows in the model, we limit ourselves here to the interpretation of effects for the industry turbulence–change model.

Experience, education, and tenure all affect rates of job mobility, though somewhat differently in the four countries. In the United States, a higher level of education was associated with higher rates of within-

TABLE 6

INDIVIDUAL-LEVEL COEFFICIENTS INDUSTRY GROSS FLOWS MODELS

	Within-Employer Mobility	Within-Industry Mobility	Industrial Mobility	Occupational Mobility	Employment Exit
Netherlands:					
Intercept	−1.90	−1.85	2.16	.48	−3.85
	(3.3)	(2.5)	(3.5)	(.9)	(4.3)
Experience	.003	−.059	−.029	−.033	−.140
	(.2)	(2.7)	(1.6)	(2.0)	(5.4)
Experience^2	−.0011	.0007	−.0005	−.0004	.0052
	(2.4)	(1.3)	(1.0)	(1.0)	(9.6)
Tenure with employer	.012	−.015	−.048	−.014	−.003
	(1.7)	(1.5)	(5.2)	(2.1)	(.4)
Lower secondary	−.35	.07	.01	.25	−.41
	(1.7)	(.3)	(.1)	(1.3)	(1.8)
Higher secondary	−.01	.02	−.13	.30	.07
	(.0)	(.1)	(.7)	(1.7)	(.3)
Tertiary vocational	.35	.21	−.20	.55	.50
	(1.9)	(.8)	(.9)	(2.8)	(2.0)
Tertiary academic	−.12	.39	−.12	.16	.46
	(.4)	(1.2)	(.4)	(.6)	(1.0)
Germany:					
Intercept	−6.07	.283	.44	−1.753	1.09
	(6.7)	(.3)	(.6)	(2.6)	(1.8)
Experience	−.039	.010	−.041	−.025	−.231
	(2.2)	(.5)	(2.3)	(1.7)	(22.6)
Experience^2	−.0009	−.0005	−.0005	−.0007	.0054
	(2.0)	(1.1)	(1.0)	(1.7)	(25.9)
Tenure with employer	.031	−.153	−.109	−.064	−.013
	(4.0)	(12.5)	(10.1)	(8.2)	(2.9)
Low secondary, no vocational	.230	−.30	.32	.447	−.53
	(.8)	(1.1)	(1.4)	(2.0)	(1.7)
High secondary, no vocational	.25	.05	−.36	.256	.11
	(.6)	(.1)	(.9)	(.8)	(.3)
Secondary + vocational	.27	.17	.23	.35	−.64
	(.9)	(.7)	(1.0)	(1.6)	(2.1)

Tertiary vocational	−.08	−.73	.46	.311	−.83
	(.2)	(1.6)	(1.5)	(1.1)	(2.3)
Tertiary academic	.45	.035	.03	.32	−.92
	(1.5)	(.1)	(.1)	(1.3)	(2.8)
United States:					
Intercept	−4.27	−1.34	.01	−.57	−1.12
	(19.0)	(5.3)	(.1)	(3.6)	(5.4)
Experience	−.043	.010	−.027	−.058	−.098
	(4.3)	(.7)	(3.0)	(7.6)	(10.7)
Experience^2	−.00006	−.0003	.0002	.0007	.0026
	(.3)	(1.0)	(.9)	(3.9)	(14.5)
Tenure with employer	.017	−.170	−.167	−.074	−.035
	(3.8)	(17.6)	(24.3)	(17.3)	(9.1)
High school	.25	−.05	−.01	−.01	−.41
	(3.1)	(.5)	(.1)	(.2)	(6.0)
Some college	.33	.01	−.14	−.11	−.55
	(3.7)	(.1)	(1.8)	(1.7)	(9.3)
Bachelor's degree or higher	.45	.13	−.31	−.34	−.86
	(5.1)	(1.2)	(3.8)	(4.9)	(9.3)
Sweden:					
Intercept	−2.94	.36	1.07	1.6809	−.08
	(3.2)	(.5)	(1.5)	(2.6)	(.1)
Experience	−.003	−.037	−.085	−.0705	−.295
	(.1)	(2.4)	(5.8)	(5.4)	(18.9)
Experience^2	−.0012	.0002	.0012	.0007	.0060
	(2.2)	(.4)	(3.4)	(2.4)	(18.3)
Tenure with employer	.046	−.033	−.044	−.0199	−.003
	(4.5)	(3.9)	(5.0)	(2.8)	(.3)
Lower secondary	.01	−.10	.16	.0094	−.31
	(.0)	(.5)	(1.0)	(.1)	(1.5)
Higher secondary	.79	−.05	.15	.1816	−.41
	(4.5)	(.4)	(1.1)	(1.6)	(2.6)
Lower tertiary	.80	.11	.09	.0878	−.64
	(4.6)	(.9)	(.8)	(.8)	(4.3)
Higher tertiary	.68	.335	−.113	−.2684	−1.251
	(3.4)	(2.3)	(.7)	(1.8)	(4.7)

NOTE.—Nos. in parentheses are t-ratios.

employer mobility and lower rates of industrial mobility, occupational mobility, and employment exit. In the Netherlands education had weak or inconsistent effects on job mobility. The more highly educated Dutch workers actually had higher rates of employment exit than their less educated coworkers, which is quite different from the U.S. pattern. Germany, like the Netherlands, lacked a clear pattern of educational effects on within-employer mobility, within-industry mobility, industrial mobility, or occupational mobility (see also Blossfeld and Mayer 1988). Unlike the Netherlands, however, more highly educated German workers had lower rates of employment exit than the less well educated.[24] Sweden was similar to the United States in that the more highly educated had higher rates of within-employer mobility and within-industry mobility and lower rates of occupational mobility and employment exit.

Next we consider the effects of experience and tenure on job mobility. The effect of an additional year of experience on outcomes will generally differ depending on whether it is an additional year of experience before or after the start of work with the current employer (experience after the start of work with an employer is of course the same thing as employer tenure). Using the coefficients from table 6, table 7 displays these two effects measured at different levels of total experience.[25] Overall, tenure effects on within-employer mobility were negative in the United States and in Germany. In Sweden, early years of tenure actually increase the probability of internal mobility, but this increment diminishes with each additional year of tenure and eventually the increment becomes zero. Initial years of tenure have no effect on Dutch rates of internal mobility, but eventually each year reduces the probability at about that same rate as found in Germany and the United States. The United States and Germany had the strongest (and negative) effects of preemployer experience on internal mobility, while the Dutch and Swedish effects were much weaker.

[24] For the employment-exit model the baseline educational category consists only of ethnic Germans. Members of the foreign sample who were coded into the lowest educational group are probably more heterogeneous in their educational backgrounds than were the ethnic Germans, because they may have had education in their home country that did not correspond to the German secondary school categories. Foreign workers coded in the lowest educational category had significantly lower rates of employment exit than did ethnic Germans in this category. For the other models, the interaction between foreign workers and the lowest educational category was not significant, and so was not included in the models reported in table 7.

[25] If we labeled the effects of experience, the square of experience, and tenure as β_1, β_2, and β_3, respectively, then the partial effect of a change of one year of tenure on the log odds of the hazard rate $= \beta_3 + \beta_1 + 2\beta_2 E$, where E = total years of experience. Similarly, the partial effect of a change of one year of prefirm experience $= \beta_1 + 2\beta_2(E_p + T) = \beta_1 + 2\beta_2 E$, where E_p = prefirm experience, and T = tenure. Taking the antilog of these quantities gives a good approximation for the change in the yearly rate of job mobility when tenure or prefirm experience is changed by one year.

TABLE 7

Change in Rates of Mobility, by Tenure and Preemployer Experience

	Tenure Effects at Experience Level			Preemployer Experience Effects at Experience Level		
	1 Year	5 Years	20 Years	1 Year	5 Years	20 Years
Within-employer mobility:						
Netherlands	.012	.004	−.028	.001	−.008	−.039
Germany	−.013	−.019	−.042	−.042	−.048	−.070
United States	−.026	−.026	−.028	−.042	−.043	−.044
Sweden	.041	.031	−.005	−.005	−.015	−.050
Within-industry mobility:						
Netherlands	−.07	−.06	−.04	−.06	−.05	−.03
Germany	−.13	−.14	−.15	.01	.01	−.01
United States	−.15	−.15	−.16	.01	.01	.00
Sweden	−.07	−.07	−.06	−.04	−.03	−.03
Industrial mobility:						
Netherlands	−.08	−.08	−.09	−.03	−.03	−.05
Germany	−.14	−.14	−.16	−.04	−.04	−.06
United States	−.18	−.17	−.17	−.03	−.02	−.02
Sweden	−.12	−.11	−.08	−.08	−.07	−.04
Occupational mobility:						
Netherlands	−.05	−.05	−.06	−.03	−.04	−.05
Germany	−.09	−.09	−.11	−.03	−.03	−.05
United States	−.18	−.17	−.17	−.03	−.02	−.02
Sweden	−.09	−.08	−.06	−.07	−.06	−.04
	1 Year	5 Years	25 Years	1 Year	5 Years	25 Years
Employment exit:						
Netherlands	−.12	−.09	.12	−.12	−.08	.13
Germany	−.21	−.17	.03	−.20	−.16	.04
United States	−.12	−.10	.00	−.09	−.07	.03
Sweden	−.25	−.21	.00	−.25	−.21	.01

Rates of within-industry employer change were strongly affected by tenure. In the United States and Germany, the negative effects of tenure were strong, while they were considerably weaker in Sweden and the Netherlands. Tenure had negative effects on both industrial and on occupational mobility; these effects were strongest in the United States, moderate in Sweden and Germany, and smallest in the Netherlands. Preemployer experience also lowered rates of industrial and occupational mobility, but its effects were not as large as tenure effects were.

Tenure and preemployer experience had strong negative effects on employment exit, at least early in the typical career. The protection of a year of tenure for very inexperienced workers was stronger in Germany and

Sweden than in Netherlands or the United States. German and Swedish men also enjoyed substantially more protection from preemployer experience than did American or Dutch men.[26] The Dutch case is distinguished by its relatively strong U-shaped pattern of effects. By the time one had acquired 25 years of experience, each additional year of either tenure or preemployer experience was considerably *raising* the Dutch log rate of employment. This distinctive Dutch pattern is no doubt explained by the pervasiveness of early retirement in the Netherlands. German rates are also positive by the 25-year point, and are second strongest among the four countries, although they lag considerably behind the Dutch rates in this respect.

To summarize, then, the effects of education were strongest in the United States and Sweden, which is consistent with hypothesis 9. Except for the case of employment exit, employer tenure had the largest effects in the United States, which also is consistent with hypothesis 9. The effects of tenure in Germany were stronger than expected, but in other respects the results are consistent with our expectations: individual resources had the largest effects in the country (the United States) with the least protected labor market. The U-shaped effect of experience on employment exit for the Netherlands is consistent with hypothesis 10. Germany shows the second quickest sign reversal for tenure and experience effects after the Netherlands, a finding that is also consistent with predictions.

DISCUSSION

The United States is clearly the country that comes closest to having an individualist mobility regime, where structural position and individual resources determine outcomes. Tenure and education differences were quite important in shaping American mobility rates. American workers were also relatively sensitive to industry or to occupation-based structural change. The results suggest that the outcomes for American workers diverged sharply depending upon individual circumstances and structural location. In only one respect is the pattern of individual-level heterogeneity in the United States relatively weak, and this concerns the effects of tenure and preemployer experience on employment exit. Swedish, Dutch, and German workers were much more rapidly integrated into the workforce than were American workers, as measured by the sharp drop-off in rates of employment exit with tenure during the early years of a typical career.

As expected from our theory, Sweden had the next-strongest effects of

[26] The German result is to be expected as a consequence of its strong occupational labor markets. The Swedish result suggests that general skills are an effective form of employment protection in that country.

contraction on occupational or industrial mobility and had strong effects of individual resources on mobility. The outcomes for Swedish workers differed sharply by education levels. Tenure effects are also prominent in Sweden, though not as prominent as in the United States. If the United States is at one extreme on a continuum of "individualized" to "collectivized" mobility chances, Sweden is a notch closer to the collective side. The reason that Sweden, a social democratic welfare state, could be so similar to the United States is precisely because Swedish welfare state benefits are citizenship based rather than employment based. The similarity between the United States and Sweden is heightened by the fact that both societies have relatively low labor market boundaries, though for very different reasons. It is the combination of welfare state policies and labor market structure that locates Sweden relatively close to the U.S. case, despite the large difference between the welfare state structures of the two countries.

In contrast, male workers in Germany and the Netherlands exhibited no tendency to change industries or occupations in response to contraction. The reason for this cannot be the lack of connection between structural change and individual mobility; indeed, both Germany and the Netherlands show an effect of structural expansion on within-industry job mobility. But labor market boundaries inhibited adjustment via occupational or industrial mobility. Instead, the effect of contraction is handled primarily through employment exits and possibly also through adjustments of hiring rates.

The Netherlands is at the other extreme from the United States in the lack of individual-level sensitivity to structural change. Our results suggest that labor force adjustment in the Netherlands has been accomplished largely through accession and employment exit. However, the Dutch results also show a highly diffuse response of employment exit to industrial or occupational contraction. We have argued that this weak response arose from the spread of the early retirement model in the Netherlands to organizations in expanding as well as contracting industries. The weak education and tenure effects, the weak response to structural push, and the pervasiveness of early retirement suggest that the Netherlands mobility regime is appropriately described as collectivist in opposition to the individualist mobility regime of the United States. But the collectivist-individualist distinction is clearly not a unidimensional continuum. The multidimensional adjustment process is influenced by an interconnected but multidimensional array of institutional policies and practices. It is only by a consideration of this multidimensional array that labor market processes become understandable.

Our approach constitutes a general strategy toward comparative research that we believe was productive in our particular analyses and use-

ful as a starting point for further work in this area. Our research, of course, raises additional questions even as it suggests some interesting answers. These findings are the product of an effort to make data from four countries as comparable as possible. However, in light of the complications arising from cross-national differences in the design of surveys and the collection of data, the results need to be tested against alternative plausible operationalizations of the variables. It would also be useful to explore alternative specifications of the model. In addition, the model needs to be extended to other processes of labor force adjustment. For example, our interpretation suggests that institutional mechanisms should also affect the role played by labor force accessions of young workers, mid-career workers, and new immigrants in response to the forces of structural change. This idea needs to be directly tested. Also, the complexity of our four-nation comparison dictated that we restrict our attention to men. Women, however, indisputably play an important role in the adjustment process, which must be a subject of further research.[27] Finally, there has been considerable speculation in recent years that Europe will be forced by global competition to make its labor markets more "flexible" and hence more individualistic in order to save its economy from stagnation. If true, this prediction would suggest that the structure of European job mobility in the middle and late 1990s may increasingly resemble the U.S. pattern. Time will tell whether this prediction turns out to be true.

APPENDIX

Data Sources and Variable Definitions

Data Sources

Netherlands.—Dutch time-series data on occupations and industries are from the Labor Force Surveys (*Enquête Beroepsbevolking*) from Statistics Netherlands for the years 1987–94, with an employed sample size ranging from 46,000 to 65,000, while Dutch longitudinal data are from the Organization for Strategic Labor Market Research (*Organisatie voor Strategisch Arbeidsmarktonderzoek;* OSA) prospective labor market supply panel, with data collection waves in October 1986, October 1988, October 1990, October 1992, and October 1994. The person-year sample size used in our analyses is 4,550. The Dutch sample is restricted to those who worked 12 or more hours in the reference week, because the labor force surveys do

[27] Research reported in DiPrete and Nonnemaker (1997) found a different mobility response (particularly for the case of job-to-job mobility) for women than for men in the United States.

not contain information on occupation for those who work fewer hours per week, nor does it count them as part of the workforce unless they are looking for a job with more hours. This omission is not a major issue when the analysis focuses on men, as it does in this article.

Germany.—German time-series data on occupations and industries are from the West German *Mikrozensus* (a 1% sample of the German population) for the years 1982, 1985, 1987, 1989, and 1991, while West German longitudinal data are from the German Socio-Economic Panel (SOEP) for the years 1984–91 for Western Germany only. Our data includes the "foreigner" (*Ausländer*) oversample. The person-year sample size used in our analyses was approximately 18,000. The German SOEP data unfortunately has a rather high (about 20%) rate of missing data on occupation and industry. These cases had to be dropped from the analysis.

United States.—Time-series data on occupations and industries are from the March Current Population Surveys (CPS), the 1% 1980 and 1990 census, while U.S. longitudinal data are from the Panel Study of Income Dynamics (PSID) for the years 1981–89, with a person-year sample size of approximately 26,000. The March 1971–March 1988 CPS files come from a data set put together by Mare and Winship (1989, 1990), while later CPS files come from the Inter-University Consortium of Political and Social Research in Ann Arbor, Michigan.

Sweden.—Time-series data are first-quarter respondents from the Labor Force Surveys (*Arbetskraftsundersökningarna*) who were interviewed in two successive years for the years 1980–91. The age range is 16–63 years and the sample size in person-years used in our analyses is approximately 28,000 for analyses involving occupation and 31,000 for analyses involving industry (because of the change in occupation codes between 1984 and 1985, data for this transition were dropped from analyses involving occupation). The Swedish retrospective longitudinal data are from the 1991 Level of Living Survey (*Levnadsnivåundersökningen*), with a person-year sample size of about 13,000. In the retrospective data, the age range is 17–65 (individuals born between 1925 and 1965 were interviewed in 1991). The Labor Force Surveys differ from the Level of Living Surveys in that they lack a measure of employer tenure and labor force experience. We therefore used the Labor Force Surveys to estimate the effects of turbulence and net change using measures of age and education as covariates. We also estimated the turbulence-change model using the Swedish retrospective data with the full set of covariates and report the individual-level coefficients from these estimates in table 6. Our estimation omits transitions for the 1986–87 period, because education was not available in the 1986 Labor Force Survey.

The time periods covered in the four countries overlap but are not iden-

tical. Differences in time periods are taken into account in the models, because for each country we specify job mobility as a function of its own pattern of structural change.

Industrial and Occupational Categories:

Netherlands.—We used three-digit occupation codes based on the four-digit CBS *Beroepenclassificatie* 1984, which is very similar to the 1968 international standard classification of occupations (ISCO; available from the International Labour Office [ILO 1968]) having only some modifications in the third and fourth digits (CBS 1984). The detailed industry codes for the Netherlands were also three-digit codes (CBS 1974).

Germany.—We used three-digit 1968 ISCO occupational categories. The industrial categories are contained in the 37-category scheme used in the German SOEP.

United States.—We used three-digit 1970 census occupational and industrial categories. We converted the 1980 census codes found in the 1983–93 CPS files to 1970 codes using the probabilistic map created by the U.S. Bureau of the Census (1989). The 1990 census codes were also converted to 1970 codes, (U.S. Bureau of the Census 1983, 1993, 1994). Because of our concern that the 1980 and 1990 census codes do not convert accurately into the 1970 residual industrial and occupational categories (the "not elsewhere classified" categories), we dropped these residual categories from the analyses. The differences in estimates are generally insensitive to the inclusion or exclusion of these categories, however.

Sweden.—The Swedish occupational schema consists of 50 categories that are very similar to a two-digit ISCO classification. The industrial schema has 66 categories, essentially a collapsed four-digit standard classification.

OECD Industrial Sectors

The OECD sectors are as follows: (1) agriculture, hunting, forestry, and fishing, (2) mining and quarrying, (3) manufacturing, (4) electricity, gas, and water, (5) construction, (6) wholesale and retail trade, restaurants, and hotels, (7) transport, storage, and communication, (8) finance, insurance, real estate, and business services, and (9) community, social, and personal services. Because mining and utilities are relatively small categories, we sometimes combined these with manufacturing.

Education

Netherlands.—We used five educational categories, based on the first digit of the Dutch educational classification system: (1) primary education,

(2) secondary education, lower level (low vocational training, low general education), (3) secondary education, upper level (intermediate vocational training, high general education), (4) tertiary education, lower level (vocational colleges), and (5) tertiary education, upper level (university).

Germany.—As in the Dutch case, we used five categories: (1) lower secondary, which requires completion of *Hauptschule* or *Realschule,* but no vocational training; (2) upper secondary (completion of an *Abitur* or *Fachhochschule,* but no vocational training); (3) secondary with vocational training, (completion of lower or upper secondary and also a program of vocational training); (4) tertiary vocational (completion of a vocational college); (5) tertiary academic (completion of an academic university degree).

United States.—Education in the United States is covered by four categories: (1) less than high school completion (less than 12 years of completed schooling); (2) high school completion (12 years of completed schooling); (3) some postsecondary education (13–15 years of completed schooling); (4) bachelor's degree or higher (16 or more years of completed schooling).

Sweden.—Five categories are applied to education in the Swedish case: (1) elementary, which includes only compulsory schooling (ranging from six to nine years dependent on age) or compulsory schooling plus vocational training of less than two years; (2) lower secondary, which is vocational training of at least two years; (3) higher secondary, a two-year high school with theoretical rather than vocational content (although some of the individuals in this category have additional vocational training); (4) lower tertiary, a longer high school of at least three years (some of these individuals have additional vocational training or a short or incomplete college education); (5) higher tertiary, the completion of university education.

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